Space Weather Forecast

Issued on Saturday 12 October 2024 at 01:10 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Waning CME effects over the next 24 hours. Slight chance of G1 at first. R1s likely.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate, with the peak flare in the period a Moderate-class X-ray flare at 11/1633UTC from a large sunspot region in the southeast.

There are now six sunspot regions on the facing side of the Sun. There are three main areas of the Sun that currently harbour sunspot regions. Perhaps the most pertinent of these was in a region in the southeast which showed areal growth, throughout the day.

No Earth-directed CMEs (Coronal Mass Ejections) have been observed over the past 24 hours.

Solar Wind / Geomagnetic Activity: This 24-hour period showed strong CME influence from the X1.8 09 October CME which hit Earth-based magnetometers at 10/1515UTC. A gradual waning trend was seen the second half of 11 October.

The solar wind speed, recorded at near Earth satellites, was strong for the first half of the UTC day, but peaked at very strong levels just before 11/1200UTC. A gradual waning trend then ensued during the second half of the day, but speeds remaining strong. The associated magnetic field was initially very strong, but declined to moderate levels around 10nT. The north-south was initially nearly perfectly anti-aligned with Earths magnetic field, This strong anti-alignment continued for the first half of the reporting period, very gradually waning in intensity. The field eventually became weakly aligned during the afternoon.

Resulting geomagnetic activity was very disturbed for the first of the day, with Strong-Severe storms (Kp7-Kp8) between 11/0000-1200UTC. Activity then decreased through the second half of the day to become unsettled (Kp3) by 11/2100UTC.

Energetic Particles / Solar Radiation: 10MeV protons started the period just above S1 levels and have since shown a gradual downward trend, falling below S1 levels from 11/0645UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate-class X-ray flares (Minor R1 radio blackouts) remain likely through this four-day period given sunspot developments on the Sun, their complexity, and perhaps two

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arrivals over the eastern solar horizon over the next 24 hours. The trend is level throughout - after an initial slightly higher risk from a very active region over the western limb.

Solar Wind / Geomagnetic Activity: The CME from the 09 October Strong-class X-ray flare and 'filament eruption' is continuing to affect Earth, but its intensity continues to wane. This is the only CME in the forecast. Either of a pair of potential 'coronal hole' fast winds may affect Earth late day 3 (Sunday 13 October), although confidence in their effects being felt is low.

There is a slight chance of G1 Minor (Kp 5) intervals early day 1 (Saturday 12 October), but activity continuing to wane further through the day to predominately Quiet-Active levels (Kp1-4) with a low confidence Slight Chance of G1 should either of the coronal holes' fast winds impinge on Earth over the next few days.

Energetic Particles / Solar Radiation: The risk of S1/Minor solar radiation storms should return to the residual risk for the current crop of sunspot regions by day 3 (Sunday 13 October). This accounts for the initial slightly raised levels in the near-Earth environment (making any further enhancements more liable to tip above S1) and the presence of the large active region over the western solar horizon. Eastern arrivals do not feature (being too far from a prone location).

Geomagnetic Storms

Geomagnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	Yes	20	5	5	5
Strong	G3	Yes	1	1	1	0
Severe	G4	Yes	1	1	1	0
Extreme	G5	No	1	1	1	0

Radio Blackouts - X-Ray Flares

X-Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 (M Class)	Yes	65	60	60	60
Very Active	R3-R5 (X Class)	No	15	10	10	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	Yes	25	20	15	10
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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